

***Epirrhoe alternata* Müll. (Lep.: Geometridae): life cycle in south-east England**

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THE RECORDS obtained at my garden m.v. light to which *E. alternata* has been attracted in fair numbers in recent years have led to my finding considerable discrepancies between them and statements concerning this insect's life cycle in the standard textbooks, including relevant local works.

A realistic appraisal of the literature perhaps begins with Barrett (1902). Regarding the time of appearance of this moth he gives May and June, and a partial generation in August and September (late July in early seasons). This pronouncement seems to have set the pattern for almost all other works that have followed. South (1939) adds to this by specifying "in the south especially", an essential refinement, as in parts of the British Isles the moth is single brooded; also the second brood is not described as being partial. Newman and Leeds (1913) in tabulated form give May and late July and August, but only one generation in the north in June. Edward Newman (1874) had suggested a somewhat similar régime, May and late July. The latest textbook is Skinner (1984) which states that the second generation of *E. alternata* is a partial one flying in August and September, and that the moth is single brooded in the north.

There are very few reputable works of a local nature, excluding checklists. Fortunately, north-west Kent is covered by the two most accurate and comprehensive. Chalmers-Hunt (1970) commenting on the species' voltinism states that specimens of the second generation are fewer in number and smaller in size; Plant (1993) – bivoltine, possibly trivoltine in some years, the moth being most abundant in late-May and early-June; also it is asserted that there appears to be no discernible break between generations.

Although from 1969 to 1978 the species was a somewhat casual visitor to my garden m.v. light, subsequently, coinciding with a good growth of cleavers *Galium aparine* in the vicinity, upon which larvae have been found, it has appeared commonly.

For the latter period 1977 to 1996, these records are shown in tabular form (Table 1), based upon the number of nights on which specimens were recorded (i.e. not the number of specimens) in half-monthly periods; the total of nights for each generation are also shown. For the whole span of twenty-nine years all first generation specimens have been singletons; from 1988 two specimens per night in the second generation has been of occasional occurrence, and once three specimens. This to a small extent offsets the constraints which include the light not being operated on distinctly unpropitious nights, mainly in May and early-June, and breaks due to my being abroad, which have been fairly evenly scattered over the two broods.

Some features of these records are at considerable variance regarding voltinism with all the textbooks, and surprisingly with the two comprehensive local works quoted. An analysis of these records indicates:

- (a) *E. alternata* is much commoner, as indicated by attraction to m.v. light, in the second generation; the figures are not consistent with a partial second generation. Some corroboration for my findings appears in Evans & Evans (1973) for north-east Surrey, an adjacent area, in which two short series of light-trap records for Addiscombe are quoted – June 1969(2), July/August 1969(47), June 1970(3), July/August 1970(16). Thus my figures give a ratio of second to first brood of nearly 4:1, those for Addiscombe 12:1. A simple, but probable explanation, for these results being contrary to those published by Chalmers-Hunt and Plant for Kent and the London area respectively lies in the nature of the records. For Dartford and Addiscombe they relate to two specific localities and m.v. light attraction over the full season; the Kent and London area records are accumulations of an arbitrary nature. They include m.v. light records from casual visits to numerous localities, to which are added sightings in other circumstances. I believe it is beyond the realms of possibility that there are aberrant colonies of *E. alternata* with life cycles so different from those of the species in the surrounding area; also I am confident that the constraints mentioned regarding my twenty-nine years of records, plus any which I have overlooked, cannot seriously undermine the validity of my interpretation of the records, and the Addiscombe records are both gratifying and interesting. Therefore I look no further for an explanation of the discrepancies than the difference in the type of record.
- (b) Here the moth is rarely noted in September, and the 13th is the latest date for a record in this month; this trend is corroborated by Plant (*ibid*) for the London area. Why September is included in almost all the standard textbooks may be due to inertia. Authors have only previous textbooks and their own experience, necessarily limited when considering the whole of the British Isles, plus notes in journals, and local works of which there are so few.
- (c) Here the time of the second generation is better described as late July and August, rather than August and September. The comment that the moth is on the wing continuously from mid-May to mid-September is not reflected for any one year by my records; a break usually occurs in late-June and early-July lasting from two to over four weeks. But it is quite conceivable that an accumulation of records from the whole London area would mask local differences in time of appearance.
- (d) The possibility of an occasional third generation at Dartford is supported by only one record, a specimen recorded for 6 October 1993, previously noted that year no later than 8 September.

Having demonstrated the preponderance of *E. alternata* at m.v. light in its second generation at Dartford, and referred to a probable similar occurrence in north-east Surrey, further examination of the insect's life cycle in south-east England is needed; for most of Britain such investigation will amount to real exploration!

Several textbooks state that the moth is single brooded in the north; however, in England it appears to remain bivoltine to the Scottish border, to Northumberland (Dunn and Parrack, 1986) and to Morecambe on the western side (Goodall, 1960).

In Scotland it remains bivoltine as far north as Sterling (Coates, 1968) and partially double-brooded on Canna (Campbell 1971). However, for the Orkney Islands, Lorimer (1983) states that the moth is univoltine, and my records for Grantown-on-Spey, Moray, suggest this is also true for parts of the Central Highlands in view of an absence of May records but numerous sightings for early July. In Ireland the species is certainly bivoltine in Co. Clare; I have specimens I have taken 26.v.1987 and 26.v.1988, and also 2.viii.1988, but it would be a mere presumption to suggest that this obtains throughout Ireland.

Table 1. Numbers of nights when *E. alternata* was recorded at m.v. light on a half-monthly basis in a Dartford garden, 1977 to 1996.

– = absent.

Year	May	June	July	Aug.	Sept.	Oct.	Brood		Total
							1st	2nd	
1977				3 2			–	5	5
1978		3	1	3			3	4	7
1979		2 1		5 3	1		3	9	12
1980	–			6 8			–	14	14
1981	1 2		2	8 5			3	15	18
1982		4	1	3 1			4	5	9
1983				7 6	–		–	13	13
1984		1		1 6			1	7	8
1985		1		2 3			1	5	6
1986		3	3	8 5			3	16	19
1987	–	1		8 9			1	17	18
1988	–	3 5	3	13 7	2		8	25	33
1989	2	2 1	8	9 2			5	19	24
1990	2 1		1 4	8 2	–		3	15	18
1991	2		1 1	12 –	1		2	15	17
1992	1 10	5 –	1 10	6	–		16	17	33
1993	2 3	– 3	3 9	9 5	3	1	5	32	38
1994	1	5 1	5 –	9 5	3		7	22	29
1995	2 4	2 2	1 11	10 2	–		10	24	34
1996	1		1	4 1	–		1	6	7

Despite *E. alternata* being a widespread and common moth throughout much of the British Isles, knowledge of its larval foodplants has until very recently remained rudimentary. Newman (*ibid*) quoted hedge bedstraw *Galium mullago* only; Chalmers-Hunt writing as late as 1970 for Kent was unable to supply the name of any larval foodplant, but in a supplement quoted D. O'Keefe as finding a larva on *G. mullago* at Eynsford in August 1969. By 1973 the larva remained unknown in north-east Surrey, no larval foodplants being mentioned by Evans & Evans (*ibid*); however, for the London area, Plant records *G. mullago*, *G. aparine* and *G. saxatile*, and is able to make the interesting suggestion that the moth can penetrate the city areas due to its ability to utilise *G. aparine*.

The observations on *E. alternata* at Dartford raise a number of points. Accepting the validity of my records and the corroboration of those for Addiscombe, why should the moth appear to be commoner in the second generation, and where else does this obtain? I suspect that there are localities further north where there is a partial second brood; if so, where are they?

This exercise has served to demonstrate the great value of legitimate local works. That my observations on voltinism are in accord with one, and conflict with two others, and that *G. aparine* is acknowledged as a larval foodplant by one, suspected by another, and not noted by a third, does not detract from the value of such works, but enhances it by drawing attention to the validity of certain methods of evaluating voltinism, and emphasising the lack of acquaintance with the larvae of even the commonest moths.

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